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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/532,507	04/25/2005	Jean-Jacque Duruz	MOL0630	6832
7590 10/17/2008				
J R Deshmukh 458 Cherry Hill Road Princeton, NJ 08540				
EXAMINER				
WILKINS III, HARRY D				
ART UNIT		PAPER NUMBER		
1795				
MAIL DATE		DELIVERY MODE		
10/17/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/532,507

Applicant(s)

DURUZ ET AL.

Examiner

Harry D. Wilkins, III

Art Unit

1795

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-33 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1 and 6-33 is/are rejected.
- 7) ☒ Claim(s) 2-5 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-946)
- 3) ☐ Information Disclosure Statement(s) (PTO/SF/ICE)
Paper No(s)/Mail Date ____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date ____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: ____

DETAILED ACTION

Response to Amendment

1. The preliminary amendment filed with the application on 25 April 2005 is noted. However, several of the amendments asked for do not match the claim set as filed. For example, claim 4 as filed does not recite "any preceding" as is requested to be removed from claim 4 and claim 7 as filed does not recite "4" as is requested to be changed to "5". As such, the preliminary amendment has not been entered.
2. Since Applicant's intent was clear from the preliminary amendment to remove all instances of multiple dependent claims, even though the preliminary amendment was not entered as being improper, all claims will be given a thorough examination and no claims will be left unexamined as per 37 CFR 1.75(c). For purposes of examination, any claim stating "any preceding claim" or two or more alternative claims will include an indication below as to how the dependency of the claim is being treated.
3. Applicant is requested to clarify all claims in any response to this office action including any disagreement to the assumed dependencies set forth below.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1, 6, 7, 9, 12-21, 32 and 33 are rejected under 35 U.S.C. 102(b) as being anticipated by de Nora et al (US 6,248,227).

De Nora et al anticipate the invention as claimed. De Nora et al teach (see abstract and col. 4, lines 18-23) a method of using a metallic anode structure for producing aluminum in a molten electrolyte containing dissolved alumina, the metallic anode structure having initially an iron-based alloy outer part with an active anode surface which is essentially metallic and free of any ceramic compounds comprising (a) substantially preventing the metallic active surface free of ceramic compounds until immersion into a molten electrolyte ("oxide-free ... surface"), (b) immersing the anode into the molten electrolyte and (c) polarizing the anode to form thereon a dense and coherent integral iron-based oxide layer (col. 2, line 39 to col. 3, line 18).

Regarding claim 6, [assumed to be amended to depend only on claim 1] de Nora et al teach (see col. 3, lines 51-60) using an iron-based alloy surfaces also containing nickel or cobalt.

Regarding claim 7, [assumed to be amended to depend only on claim 1] de Nora et al teach (see col. 3, lines 51-60) using an iron-based alloy surfaces also containing alloying elements such as copper, manganese or cobalt, and/or doping with elements such as titanium, zirconium, hafnium, manganese, cobalt, aluminum, chromium, magnesium or copper.

Regarding claim 9, [assumed to be amended to depend only on claim 1] de Nora et al teach (see examples) that the method of making the anodes involved casting.

Regarding claim 12, [assumed to be amended in line 11 to depend only on claim 1] de Nora et al teach (see col. 4, lines 24-32) that the anodes could be conditioned or

reconditioned by clearing and cleaning (i.e.-removing all ceramic compounds from the surface) and reforming the anode by self-forming the active oxide-based surface layer.

Regarding claim 13, [assumed to be amended in line 3 to depend only on claim 1] de Nora et al teach (see col. 2, lines 33-36) that the method included self-forming the oxide layer and also electrowinning (i.e.-electrolyzing dissolved alumina) in the same molten electrolyte as claimed.

Regarding claim 14, [assumed to be unchanged in dependency] the method of de Nora et al continues to form the oxide surface layer (see col. 3, lines 1-18) during electrolysis.

Regarding claim 15, [assumed to be unchanged in dependency] the method of de Nora et al includes slow dissolution of the oxide surface layer (see col. 3, lines 1-18).

Regarding claim 16, [assumed to be amended to depend only on claim 13] since the method of de Nora et al includes a slow dissolution of the material of the oxide surface layer, the method automatically controls the amount of dissolved iron species to inhibit further dissolution of the oxide surface layer.

Regarding claim 17, [assumed to be amended to depend only on claim 13] de Nora et al teach (see col. 4, lines 56-58) operating at 950-970°C, or at lower temperatures as low as 700°C.

Regarding claim 18, [assumed to be amended to depend only on claim 13] de Nora et al teach (see examples) using cryolite as the molten electrolyte. Cryolite was known to exist at a ratio of about 1.5 as shown by Johnson.

Regarding claim 19, [assumed to be amended to depend only on claim 13] de Nora et al teach (see examples) using alumina dissolved at approximately 6 wt%.

Regarding claim 20, [assumed to be amended to depend only on claim 13] de Nora et al teach (see col. 5, lines 29-36) including means for circulating the electrolyte as claimed.

Regarding claim 21, [assumed to be amended to depend only on claim 1] de Nora et al, as above, teach such an anode structure.

Regarding claims 32 and 33, [assumed to be unamended] de Nora et al teach such an aluminum electrowinning cell with an aluminum wettable cathode (see col. 4, lines 38-42).

6. Claims 22-27 are rejected under 35 U.S.C. 102(b) as being anticipated by Jackson (US 3,861,938).

[Claim 22 is assumed to be unamended.]

Jackson anticipates the invention as claimed. Jackson teaches (see col. 1, line 66 to col. 3, line 8) an iron-based component which is coated with a temporary protection medium comprising a solid layer of a ceramic (chromium oxide).

With respect to the scope of claim 22, particularly the recitation "anode structure", nothing in the claim body further limits this feature, such that it is merely the intended use of the claimed structure. As such, since any piece of ferrous metal was capable of functioning as an anode as claimed, the structure taught by Jackson anticipates the claim.

Regarding claim 23, [assumed to be unamended] the temporary coating of Jackson was removable.

Regarding claim 24, [assumed to be amended to depend from claim 22 only] all materials would be soluble to at least some degree in a molten electrolyte.

Regarding claim 25, [assumed to be amended to depend from claim 22 only] the temporary protective coating of Jackson was a solid layer.

Regarding claim 26, [assumed to be unamended] the temporary protective coating of Jackson was a ceramic.

Regarding claim 27, [assumed to be amended to depend from claim 25 only] the temporary protective coating of Jackson included chromium.

7. Claims 22-25 and 28-29 are rejected under 35 U.S.C. 102(b) as being anticipated by Arai et al (US 5,069,929).

[Claim 22 is assumed to be unamended.]

Arai et al anticipate the invention as claimed. Arai et al teach (see abstract and col. 1, line 12 to col. 4, line 34) an iron-based component which is coated with a temporary protection medium comprising a solid layer of a polymer.

With respect to the scope of claim 22, particularly the recitation "anode structure", nothing in the claim body further limits this feature, such that it is merely the intended use of the claimed structure. As such, since any piece of ferrous metal was capable of functioning as an anode as claimed, the structure taught by Arai et al anticipates the claim.

Regarding claim 23, [assumed to be unamended] the temporary coating of Arai et al was removable.

Regarding claim 24, [assumed to be amended to depend from claim 22 only] all materials would be soluble to at least some degree in a molten electrolyte.

Regarding claim 25, [assumed to be amended to depend from claim 22 only] the temporary protective coating of Arai et al was a solid layer.

Regarding claim 28, [assumed to be amended to depend from claim 25 only] the temporary protective coating of Arai et al was a solid polymer.

Regarding claim 29, [assumed to be unamended] although Arai et al do not teach use of a vacuum or inert atmosphere during application of the polymer coating, since the purpose of the coating was to prevent oxidation of the underlying metal, it would have been obvious to have limited the exposure of the unprotected metal to an oxidizing atmosphere, such that one of ordinary skill in the art would have been motivated to keep the uncoated metal under vacuum or inert gas until the coating was completed to prevent oxidation of the unprotected metal.

Regarding claim 30, [assumed to be amended to depend from claim 22 only] Arai et al teach the existence of an additional layer on the metal comprising liquid oil.

8. Claims 22-24 and 31 are rejected under 35 U.S.C. 102(b) as being anticipated by Schmidt (US 5,498,299).

[Claim 22 is assumed to be unamended.]

Schmidt anticipate the invention as claimed. Schmidt teaches (see abstract) an iron-based component which is maintained with an inert gas above its surface.

With respect to the scope of claim 22, particularly the recitation "anode structure", nothing in the claim body further limits this feature, such that it is merely the intended use of the claimed structure. As such, since any piece of ferrous metal was capable of functioning as an anode as claimed, the structure taught by Arai et al anticipates the claim.

Regarding claim 23, [assumed to be unamended] the gas of Schmidt was removable.

Regarding claim 24, [assumed to be amended to depend from claim 22 only] all materials would be soluble to at least some degree in a molten electrolyte.

Regarding claim 31, [assumed to be amended to depend from claim 22 only] Schmidt teaches using an inert atmosphere above an iron-based article to prevent oxidation of the surface.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over de Nora et al (US 6,248,227).

[Claim 8 is assumed to be amended to depend from claim 6 in correspondence with Applicant's attempted amendment to claim 7.]

De Nora et al teaches using iron-based surfaces, and possible alloying with nickel or cobalt, but does expressly teach using the alloy composition claimed.

Since de Nora et al teaches a broad range of the surface layer composition, mainly composed of iron and nickel, and the composition of claim 8 can be merely a iron-nickel alloy without any copper or further elements, it would have been within the expected skill of a routineer in the art to have optimized the ratio of iron and nickel within the broad range disclosed by de Nora et al to optimize the effectiveness of the surface for use as an anode in electrowinning of aluminum.

11. Claims 10 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over de Nora et al (US 6,248,227) in view of de Nora et al (US 6,436,274).

[Claim 10 is assumed to be unamended and claim 11 is assumed to be amended to depend only from claim 9.]

De Nora et al '227 teaches, as above, making cast anodes, but does not teach subjecting them to quenching or annealing.

However, de Nora et al '274 teaches making the same type of anodes from HSLA steels, and that the production method of those anodes required tempering or annealing after heating to prevent thermal shocks from causing mechanical stresses in the anodes.

Therefore, it would have been obvious to one of ordinary skill in the art to have performed a quench and temper process on the cast anode of de Nora et al '227 as suggested by de Nora et al '274 for the purpose of preventing thermal shock to the anode resulting in structural damage due to mechanical stresses.

Allowable Subject Matter

12. Claims 2-5 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

13. The following is a statement of reasons for the indication of allowable subject matter: Claim 2 [assumed unamended]: de Nora et al provide no motivation to perform a pre-heating step while still maintaining the surface of the anode free of ceramic compounds since de Nora et al clearly suggest that pre-oxidation is acceptable. Claim 3 [assumed amended to depend from claim 1 only]: de Nora et al provide no motivation to use a temporary protective layer to prevent pre-oxidation of the surface since de Nora et al clearly suggest that pre-oxidation is acceptable. Claim 4 [assumed unamended]: allowable for the same reason as claim 3. Claim 5 [assumed amended to depend from claim 1 only]: de Nora et al provide no motivation to perform a pre-heating step while still maintaining the surface of the anode free of ceramic compounds since de Nora et al clearly suggest that pre-oxidation is acceptable.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Harry D. Wilkins, III whose telephone number is 571-272-1251. The examiner can normally be reached on M-F 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy Tsang-Foster can be reached on 571-272-1293. The fax phone

number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Harry D Wilkins, III/
Primary Examiner, Art Unit 1795

hdw